

IN THE CLAIMS

1. (currently amended) A receiving apparatus in a communication system for encoding transmit data of a plurality of channels at respective ones of transmission time intervals (TTIs), partitioning the encoded data of each channel at a frame period to obtain frame data of prescribed bit lengths, transmitting and multiplexing the frame data of each channel, and transmitting, frame by frame, identification information (TFCI) that specifies frame-data length information (TFI) of the frame data on each channel, said apparatus comprising:

a storage unit for storing multiplexed data that has been received;

a discrimination unit for discriminating, frame by frame, frame-data length information (TFI) on each channel based upon the identification information (TFCI) that has been received;

a decision unit for checking whether the frame-data length information (TFIs) of all frames within the transmission time interval (TTI) agree or not on a per-channel basis, and for deciding, on a per-channel basis if even one TFI differs, that the largest number of items of frame-data length information (TFI) that are the same among the items of frame-data length information in a plurality of frames within a transmission time interval (TTI) is frame-data length information common to all of said plurality of frames within the transmission time interval;

a demultiplexer for identifying bit length per frame of each channel based upon the frame-data length information (TFI) that has been decided, and demultiplexing multiplexed data, which has been stored in the storage unit, channel by channel on the basis of the bit length; and

a decoder for joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-channel basis.

2. (currently amended) A receiving apparatus in a communication system for encoding transmit data of a plurality of channels at respective ones of transmission time intervals (TTIs), partitioning the encoded data of each channel at a frame period to obtain frame data of prescribed bit lengths, transmitting and multiplexing the frame data of each channel, enclosing identification information (TFCI) that specifies frame-data length information (TFI) of the frame data on each channel, and transmitting the encoded information frame by frame, said apparatus comprising:

- a storage unit for storing multiplexed data that has been received;
- an identification information decoder for decoding the identification information (TFCI) that has been received; ~~and~~ a likelihood holding unit for holding likelihood calculated when the decoding is performed;
- a discrimination unit for discriminating, frame by frame, the frame-data length information (TFI) on each channel based upon the identification information that has been decoded;
- a decision unit for comparing, on a per-channel basis, frame-data length information of a plurality of frames within respective ones of the transmission time intervals and, if frame-data length information differs, deciding, by using the likelihood, frame-data length information that is common to all of the plurality of frames within the transmission time interval;
- a demultiplexer for identifying bit length per frame of each channel based upon the frame-data length information that has been decided, and demultiplexing multiplexed data, which has been stored in the storage unit, channel by channel on the basis of the bit length; and
- a decoder for joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-channel basis.

3. (original) A receiving apparatus in a communication system for encoding transmit data of each of a plurality of channels at a prescribed transmission time interval, partitioning the encoded data of each channel at a frame period to obtain frame data of a prescribed bit length, transmitting and multiplexing the frame data of each channel, and transmitting, frame by frame, identification information that specifies a combination of frame-data length information of each channel, said apparatus comprising:

a storage unit for storing multiplexed data that has been received;

a discrimination unit for discriminating, frame by frame, the frame-data length information on each channel based upon the identification information that has been received;

a decision unit for correcting erroneous frame-data length information, among frame-data length information of a plurality of frames within a transmission time interval T1 on a channel whose transmission time interval is T1, to correct frame-data length information, and, when deciding frame-data length information common to a plurality of frames within a transmission time interval T2 on another channel inclusive of a frame corresponding to the corrected frame on said channel whose transmission time interval is T2, deciding upon frame-data length information, which has been discriminated with regard to a frame other than the frame corresponding to the corrected frame, as the common frame-data length information;

a demultiplexer for identifying bit length per frame of each channel based upon the frame-data length information that has been decided, and demultiplexing multiplexed data, which has been stored in said storage unit, channel by channel on the basis of the bit length; and

a decoder for joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-channel basis.

4. (original) The apparatus according to claim 3, wherein $T1 > T2$ holds.

5. (currently amended) A receiving apparatus in a communication system for encoding transmit data of each of a plurality of channels at a prescribed transmission time interval (TTI), partitioning the encoded data of each channel at a frame period to obtain frame data of a prescribed bit length, transmitting and multiplexing the frame data of each channel, and transmitting, frame by frame, identification information (TFCI) that specifies a combination of frame-data length information (TFI) of each channel, said apparatus comprising:

a storage unit for storing multiplexed data that has been received;

a discrimination unit for discriminating, frame by frame, the frame-data length information (TFI) on each channel based upon the identification information (TFCI) that has been received;

a TFI-error detection/correction unit for checking whether the frame-data length information (TFIs) of all frames within the transmission time interval (TTI) agree or not on a per-channel basis, and correcting, if even one TFI differs, an erroneous frame-data length information (TFI);

a demultiplexer for identifying bit length per frame of each channel based upon the frame-data length information (TFI) that has been discriminated or corrected, regarding that frame data of each of the channels has been multiplexed in order of decreasing transmission time interval (TTI) and demultiplexing the multiplexed data, which has been stored in said storage unit, on the basis of the multiplexing sequence and the identified bit length of each channel; and

a decoder for joining and decoding, in an amount equivalent to the respective transmission time interval, the frame data that has been demultiplexed on a per-channel basis.

6. (withdrawn from consideration) A transmitting apparatus comprising:

an encoder for encoding transmit data of each of a plurality of channels at a prescribed transmission time interval;

a multiplexer for partitioning the encoded transmit data of each channel at a frame period to obtain frame data of a prescribed bit length and, among the frame data of each of the channels, multiplexing the frame data in such a manner that frame data having a long transmission time interval will come at the beginning or such that frame data having a short transmission time interval will come at the end; and

a transmitting unit for transmitting, frame by frame together with the multiplexed data, identification information that specifies a combination of frame-data length information of each channel multiplexed.

7. (currently amended) A receiving method in a communication system for encoding transmit data of a plurality of channels at respective ones of transmission time intervals (TTIs), partitioning the encoded data of each channel at a frame period to obtain frame data of prescribed bit lengths, transmitting and multiplexing the frame data of each channel, and transmitting, frame by frame, identification information (TFCD) that specifies frame-data length information (TFI) of the frame data of each channel, said method comprising the steps of:

storing multiplexed data that has been received and discriminating, frame by frame, frame-data length information (TFI) on each channel based upon identification information (TFCD) that has been received;

checking whether the frame-data length information (TFIs) of all frames within the transmission time interval (TTI) agree or not on a per-channel basis;

deciding, ~~on a per-channel basis~~ if even one TFI differs, that the largest number of items of frame-data length information (TFI) that are the same among the items of frame-data length information in a plurality of frames within a transmission time interval (TTI) is frame-data length information common to all of said plurality of frames within the transmission time interval;

identifying bit length per frame of each channel based upon the frame-data length information (TFI) that has been decided;

demultiplexing multiplexed data, which has been stored in the storage unit, channel by channel on the basis of the bit length; and

joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-channel basis.

8. (currently amended) A receiving method in a communication system for encoding transmit data of a plurality of channels at respective ones of transmission time intervals (TTIs), partitioning the encoded data of each channel at a frame period to obtain frame data of prescribed bit lengths, transmitting and multiplexing the frame data of each channel, and transmitting, frame by frame, identification information (TFCI) that specifies frame-data length information (TFI) of the frame data on each channel, said method comprising the steps of:

storing multiplexed data that has been received, decoding the identification information (TFCI) that has been received and holding likelihood calculated when the decoding is performed;

discriminating the frame-data length information (TFI) on each channel based upon the identification information that has been decoded;

comparing, on a per-channel basis, frame-data length information of a plurality of frames within respective ones of the transmission time intervals and, if frame-data length information differs, deciding, by using the likelihood, frame-data length information that is common to all of the plurality of frames within the transmission time interval;

identifying bit length per frame of each channel based upon the frame-data length information that has been decided;

demultiplexing multiplexed data, which has been stored, channel by channel on the basis of the bit length; and

joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-channel basis.

9. (original) A receiving method in a communication system for encoding transmit data of each of a plurality of channels at a prescribed transmission time interval, partitioning the encoded data of each channel at a frame period to obtain frame data of a prescribed bit length, transmitting and multiplexing the frame data of each channel, and transmitting, frame by frame, identification information that specifies a combination of frame-data length information of each channel, said method comprising the steps of:

storing multiplexed data that has been received and discriminating, frame by frame, the frame-data length information on each channel based upon the identification information that has been received;

correcting erroneous frame-data length information, among frame-data length information of a plurality of frames within a transmission time interval T1 on a channel whose transmission time interval is T1, to correct frame-data length information, and, when deciding

frame-data length information common to a plurality of frames within a transmission time interval T2 on another channel inclusive of frame corresponding to the corrected frame on said channel whose transmission time interval is T2, deciding upon frame-data length information, which has been discriminated with regard to a frame other than the frame corresponding to the corrected frame, as the common frame-data length information;

identifying bit length per frame of each channel based upon the frame-data length information that has been decided;

demultiplexing multiplexed data, which has been stored, channel by channel on the basis of the bit length; and

joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-channel basis.

10. (currently amended) A receiving method in a communication system for encoding transmit data of each of a plurality of channels at a prescribed transmission time interval (TTI), partitioning the encoded data of each channel at a frame period to obtain frame data of a prescribed bit length, transmitting and multiplexing the frame data of each channel, and transmitting, frame by frame, identification information (TFCI) that specifies a combination of frame-data length information (TTI) of each channel, said method comprising the steps of:

storing multiplexed data that has been received and discriminating, frame by frame, the frame-data length information (TFI) on each channel based upon the identification information (TFCI) that has been received;

checking whether the frame-data length information (TFIs) of all frames within the transmission time interval (TTI) agree or not on a per-channel basis, and correcting, if even one TFI differs, an erroneous frame-data length information (TFI);

identifying bit length per frame of each channel based upon the frame-data length information (TFI) that has been discriminated or corrected;

regarding that frame data of each of the channels has been multiplexed in order of decreasing transmission time interval (TTI) and demultiplexing the stored multiplexed data on the basis of the multiplexing sequence and the identified bit length of each channel; and

joining and decoding, in an amount equivalent to the respective transmission time interval, the frame data that has been demultiplexed on a per-channel basis.

11. (withdrawn from consideration) A transmitting method in a communication system, comprising the steps of:

encoding transmit data of each of a plurality of channels at a prescribed transmission time interval;

partitioning the encoded transmit data of each channel at a frame period to obtain frame data of a prescribed bit length and, among the frame data of each of the channels, multiplexing the frame data in such a manner that frame data having a long transmission time interval will come at the beginning or such that frame data having a short transmission time interval will come at the end; and

transmitting, frame by frame together with the multiplexed data, identification information that specifies a combination of frame-data length information of each channel multiplexed.

12. (original) A receiving apparatus in a CDMA communication system for encoding transmit data of each of a plurality of transport channels at a predetermined transmission time interval (TTI), partitioning the encoded data of each transport channel at a frame period to obtain frame data of a prescribed bit length, multiplexing and transmitting the frame data of each transport channel, and transmitting, frame by frame, combination information (TFCI) of transport formats (TFIs) that specify the frame data length of each transport channel, said apparatus comprising:

a storage unit for storing multiplexed data that has been received;

a transport format discrimination unit for decoding the TFCI frame by frame and discriminating a transport format (TFI) in each transport channel frame by frame based upon the TFCI;

a transport format decision unit for comparing, on a per-transport-channel basis, transport formats (TFIs) on a plurality of frames within a prescribed transmission time interval (TTI) that conforms to the transport channel and, if transport formats differ, deciding a transport format (TFI) in the transmission time interval (TTI) by majority decision;

a demultiplexer for identifying bit length per frame of each transport channel based upon the transport format (TFI) decided and demultiplexing multiplexed data, which has been stored in said storage unit, channel by channel on the basis of the bit length; and

a decoder for joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-transport-channel basis.

13. (currently amended) A receiving apparatus in a CDMA communication system for encoding transmit data of each of a plurality of transport channels at a predetermined transmission time interval (TTI), partitioning the encoded data of each transport channel at a frame period to obtain frame data of a prescribed bit length, multiplexing and transmitting the frame data of each transport channel, and transmitting, frame by frame, combination information (TFCI) of transport formats (TFIs) that specify the frame data length of each transport channel, said apparatus comprising:

a storage unit for storing multiplexed data that has been received;

a TFCI decoder for decoding the TFCI frame by frame;

a likelihood holding unit for holding likelihood calculated when the decoding is performed;

a transport format discrimination unit for discriminating, frame by frame, the transport format (TFI) on each transport channel based upon the TFCI that has been decoded;

a transport format decision unit for comparing, on a per-transport-channel basis, transport formats (TFIs) of a plurality of frames within a transmission time interval (TTI) that conforms to the transport channel and, if transport formats differ, deciding a transport format (TFI) in the transmission time interval (TTI) using likelihood and transport format (TFI) of each frame;

a demultiplexer for identifying bit length per frame of each transport channel based upon the transport format decided and demultiplexing and multiplexed data, which has been stored in said storage unit, channel by channel on the basis of the bit length; and

a decoder for joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-transport-channel basis.

14. (original) The apparatus according to claim 13, wherein said transport format decision unit totals the likelihoods of identical transport formats (TFIs) and decides upon the transport format (TFI) for which the total of the likelihoods is largest as the transport format (TFI) in the transmission time interval (TTI).

15. (original) The apparatus according to claim 13, wherein said TFCI decoder decides upon a TFCI candidate, which has the highest likelihood among the likelihoods of TFCI candidates calculated at the time of decoding, as the TFCI in a frame of interest, calculates degree of reliability of the TFCI using the likelihood of each TFCI candidate and holds the degree of reliability calculated; and

said transport format decision unit decides upon a transport format (TFI) for which the degree of reliability is highest as the transport format (TFI) in the transmission time interval (TTI).

16. (original) A receiving apparatus in a CDMA communication system for encoding transmit data of each of a plurality of transport channels at a predetermined transmission time interval (TTI), partitioning the encoded data of each transport channel at a frame period to obtain frame data of prescribed bit length, multiplexing and transmitting the frame data of each transport channel, and transmitting, frame by frame, combination information (TFCI) of transport formats (TFIs) that specify the frame data length of each transport channel, said apparatus comprising:

a storage unit for storing multiplexed data that has been received;

a TFCI decoder for decoding the TFCI frame by frame;

a transport format discrimination unit for discriminating, frame by frame, the transport format (TFI) on each transport channel based upon the TFCI that has been decoded;

a transport format decision unit which, in a transport channel of a longest transmission time interval (TTI), is for correcting, to a correct TFI, an erroneous transport format (TFI) among transport formats (TFIs) of a plurality of frames within the longest transmission time interval, and which, in a different transport channel, is for checking to determine whether transport formats (TFIs) of a plurality of frames within a transmission time interval that conforms to the other transport channel inclusive of the corrected frame agree, said transport format decision unit judging, if transport formats do not agree, that a transport format in a frame other than the corrected frame is correct and deciding the transport format (TFI) in the transmission time interval (TTI);

a demultiplexer for identifying bit length per frame of each transport channel based upon the transport format decided and demultiplexing the multiplexed data, which has been stored in said storage unit, channel by channel on the basis of the bit length; and

a decoder for joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-transport-channel basis.

17. (canceled)

18. (withdrawn from consideration) A transmitting apparatus in a CDMA communication system, comprising:

an encoder for encoding transmit data of each of a plurality of transport channels at a prescribed transmission time interval (TTI);

a multiplexer for partitioning the encoded data at a frame period to obtain frame data of a prescribed bit length, and multiplexing the frame data of each transport channel in order of decreasing transmission time interval (TTI); and

a transmitting unit for transmitting, frame by frame together with the multiplexed data, combination information (TFCI) of transport formats (TFIs) that specify the frame data length of each transport channel.

19. (original) A receiving method in a CDMA communication system for encoding transmit data of each of a plurality of transport channels at a predetermined transmission time interval (TTI), partitioning the encoded data of each transport channel at a frame period to obtain frame data of a prescribed bit length, multiplexing and transmitting the frame data of each transport channel, and transmitting, frame by frame, combination information (TFCI) of transport formats (TFIs) that specify the frame data length of each transport channel, said method comprising the steps of:

storing received multiplexed data and decoding a TFCI frame by frame;

discriminating a transport format (TFI) in each transport channel frame by frame based upon the TFCI of every frame;

comparing, on a per-transport-channel basis, transport formats (TFIs) of a plurality of frames within a transmission time interval (TTI) that conforms to the transport channel and, if transport formats differ, deciding a transport format (TFI) in the transmission time interval (TTI) by majority decision;

identifying bit length per frame of each transport channel based upon the transport format (TFI) decided;

demultiplexing the stored multiplexed data channel by channel on the basis of the bit

length; and

joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-transport-channel basis.

20. (currently amended) A receiving method in a CDMA communication system for encoding transmit data of each of a plurality of transport channels at a predetermined transmission time interval (TTI), partitioning the encoded data of each transport channel at a frame period to obtain frame data of a prescribed bit length, multiplexing and transmitting the frame data of each transport channel, and transmitting, frame by frame, combination information (TFCI) of transport formats (TFIs) that specify the frame data length of each transport channel, said method comprising the steps of:

storing multiplexed data that has been received, decoding the TFCI frame by frame ~~and~~;
a likelihood holding unit for holding likelihood calculated when the decoding is performed;

discriminating a transport format (TFI) in each transport channel frame by frame based upon the TFCI of every frame;

comparing, on a per-transport-channel basis, transport formats (TFIs) of a plurality of frames within a transmission time interval (TTI) that conforms to the transport channel and, if transport formats differ, deciding a transport format (TFI) in the transmission time interval (TTI) using the likelihood and transport format (TFI) of each frame;

identifying bit length per frame of each transport channel based upon the transport format (TFI) decided;

demultiplexing the stored multiplexed data channel by channel on the basis of the bit length; and

joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-transport-channel basis.

21. (original) The method according to claim 20, further comprising the step of totaling the likelihoods of identical transport formats (TFIs) and deciding upon the transport format (TFI) for which the total of the likelihoods is largest as the transport format (TFI) in the transmission time interval (TTI).

22. (original) The method according to claim 20, further comprising the steps of:
deciding upon a TFCI candidate, which has the highest likelihood among the likelihoods of TFCI candidates calculated at the time of decoding, as the TFCI in a frame of interest, calculating degree of reliability of the TFCI using the likelihood of each TFCI candidate, and holding the degree of reliability calculated; and

deciding upon a transport format (TFI) for which the degree of reliability is highest as the transport format (TFI) in the transmission time interval (TTI).

23. (original) A receiving method in a CDMA communication system for encoding transmit data of each of a plurality of transport channels at a predetermined transmission time interval (TTI), partitioning the encoded data of each transport channel at a frame period to obtain frame data of a prescribed bit length, multiplexing and transmitting the frame data of each transport channel, and transmitting, frame by frame, combination information (TFCI) of

transport formats (TFIs) that specify the frame data length of each transport channel, said method comprising the steps of:

storing received multiplexed data and decoding a TFCI frame by frame;

discriminating, frame by frame, the transport format (TFI) on each transport channel based upon the TFCI that has been decoded;

in a transport channel of a longest transmission time interval (TTI), correcting, to a correct TFI, an erroneous transport format (TFI) among transport formats (TFIs) of a plurality of frames within the longest transmission time interval, in a different transport channel, checking to determine whether transport formats (TFIs) of a plurality of frames within a transmission time interval that conforms to the other transport channel inclusive of the corrected frame agree and, if transport formats do not agree, deciding that a transport format in a frame other than the corrected frame is correct and correcting the transport format (TFI) in the transmission time interval (TTI);

identifying bit length per frame of each transport channel based upon the corrected transport format (TFI);

demultiplexing the stored multiplexed data channel by channel on the basis of the bit length; and

joining and decoding, in an amount equivalent to the transmission time interval, frame data that has been demultiplexed on a per-transport-channel basis.

24. (canceled)

25. (withdrawn from consideration) A transmitting method in a communication system, comprising the steps of:

- encoding transmit data of each of a plurality of transport channels at a prescribed transmission time interval (TTI);
- partitioning the encoded data at a frame period to obtain frame data of a prescribed bit length and multiplexing the frame data of each of the transport channels in order of decreasing transmission time interval (TTI);
- transmitting, together with the multiplexed data, combination information (TFCI) of transport formats (TFIs) that specify the frame data length of each transport channel.